

What is claimed is:

1. A variable valve control apparatus for an internal combustion engine provided with a plurality of cylinders, comprising:
 - an intake valve disposed to each of said plurality of cylinders;
 - a variable valve mechanism that varies successively a lift amount of said intake valve;
 - a controller that controls said variable valve mechanism based on a target lift amount corresponding to a target intake air amount of said internal combustion engine; and
 - a detector detecting the combustion variation of said internal combustion engine, wherein, when the target lift amount of said intake valve is a predetermined value or less, said controller limits the target lift amount of said intake valve to said predetermined value or above when the combustion variation of said internal combustion engine reaches an allowable value or above.
2. A variable valve apparatus for an internal combustion engine according to claim 1, wherein a throttle valve that is opened and closed by an actuator is disposed to an intake pipe of said internal combustion engine, and
 - said controller controls an opening of said throttle valve to control an intake air amount to the target intake air amount, when limiting the target lift amount of said intake valve to the predetermined value or above.
3. A variable valve apparatus for an internal combustion engine according to claim 1, wherein said internal combustion engine includes a plurality of cylinder groups, and also said variable valve mechanism is disposed to each of said plurality of cylinder groups;
 - said detector detects the combustion variation of each of said plurality of cylinder groups; and
 - said controller limits the target lift amount for each of said plurality of cylinder groups.
4. A variable valve apparatus for an internal combustion engine according to claim 3, wherein said controller controls a fuel injection quantity for each of said plurality of cylinder groups depending on a difference in target lift amount between said plurality of cylinder groups.
5. A variable valve apparatus for an internal combustion engine according to claim 3, wherein said controller controls ignition timing for each of said plurality of cylinder groups depending on a difference in target lift amount between said plurality of cylinder groups.

6. A variable valve apparatus for an internal combustion engine according to claim 1, wherein said controller outputs a failure detection signal of said variable valve mechanism when the combustion variation of said internal combustion engine exceeds a failure judgment value larger than said allowable value.
7. A variable valve apparatus for an internal combustion engine according to claim 1, wherein there is provided a rotation detector detecting a rotation speed of said internal combustion engine, and
said controller variably sets the predetermined value of said target lift amount according to the engine rotation speed.
8. A variable valve control apparatus for an internal combustion engine provided with a plurality of cylinders, comprising:
an intake valve disposed to each of said plurality of cylinders;
variable valve means for varying successively a lift amount of said intake valve;
calculating means for calculating a target lift amount corresponding to a target intake air amount of said internal combustion engine;
detecting means for detecting the combustion variation of said internal combustion engine;
limiting means for limiting, when the target lift amount of said intake valve is a predetermined value or less, the target lift amount calculated by said calculating means to said predetermined value or above when the combustion variation of said internal combustion engine reaches an allowable value or above; and
control means for controlling said variable valve means based on said target lift amount.
9. A variable valve control apparatus for an internal combustion engine provided with a plurality of cylinders, comprising:
an intake valve disposed to each of said plurality of cylinders;
a variable valve mechanism that varies successively a lift amount of said intake valve;
a controller that controls said variable valve mechanism based on a target lift amount corresponding to a target intake air amount of said internal combustion engine; and
a detector detecting the lift amount for each intake valve,
wherein, when the target lift amount of said intake valve is a predetermined value or less, said controller limits the target lift amount of said intake valve to said predetermined value or above when the variation in lift amount of said intake valve is an allowable value or above.

10. A variable valve apparatus for an internal combustion engine according to claim 9, wherein a throttle valve that is opened and closed by an actuator is disposed to an intake pipe of said internal combustion engine, and
said controller controls an opening of said throttle valve to control an intake air amount to the target intake air amount, when limiting the target lift amount of said intake valve to the predetermined value or above.
11. A variable valve apparatus for an internal combustion engine according to claim 9, wherein said controller outputs a failure detection signal of said variable valve mechanism when the variation in lift amount exceeds a failure judgment value larger than said allowable value.
12. A variable valve apparatus for an internal combustion engine according to claim 9, wherein there is provided a rotation detector detecting a rotation speed of said internal combustion engine, and
said controller variably sets the predetermined value of said target lift amount according to the engine rotation speed.
13. A variable valve control apparatus for an internal combustion engine provided with a plurality of cylinders, comprising:
an intake valve disposed to each of said plurality of cylinders;
variable valve means for varying successively a lift amount of said intake valve;
calculating means for calculating a target lift amount corresponding to a target intake air amount of said internal combustion engine;
detecting means for detecting the lift amount for each intake valve;
limiting means for limiting, when the target lift amount is a predetermined value or less, the target lift amount to said predetermined value or above when the variation in lift amount of said intake valve is an allowable value or above; and
control means for controlling said variable valve means based on said target lift amount.
14. A variable valve control method for an internal combustion engine provided with an intake valve for each of a plurality of cylinders, and a variable valve mechanism that varies successively a lift amount of said intake valve, comprising the steps of:
calculating a target lift amount corresponding to a target intake air amount of said internal combustion engine;
detecting the combustion variation of said internal combustion engine;
limiting, when the target lift amount is a predetermined value or less, the target lift amount to said predetermined value or above when the combustion variation of said internal

combustion engine reaches an allowable value or above; and
controlling said variable valve mechanism based on said target lift amount.

15. A variable valve method for an internal combustion engine according to claim 14, further comprising the step of;

controlling an opening of a throttle valve disposed to an intake pipe of said internal combustion engine, to control an intake air amount to the target intake air amount when limiting the target lift amount to the predetermined value or above.

16. A variable valve method for an internal combustion engine according to claim 14, wherein said step of detecting the combustion variation detects the combustion variation of each of a plurality of cylinder groups, each group provided independently with said variable valve mechanism, and

said step of limiting said target lift amount limits the target lift amount for each of said plurality of cylinder groups.

17. A variable valve method for an internal combustion engine according to claim 16, further comprising the step of;

controlling a fuel injection quantity for each of said plurality of cylinder groups depending on a difference in target lift amount between said plurality of cylinder groups.

18. A variable valve method for an internal combustion engine according to claim 16, further comprising the step of;

controlling ignition timing for each of said plurality of cylinder groups depending on a difference in target lift amount between said plurality of cylinder groups.

19. A variable valve method for an internal combustion engine according to claim 14, further comprising the step of;

outputting a failure detection signal of said variable valve mechanism when the combustion variation of said internal combustion engine exceeds a failure judgment value larger than said allowable value.

20. A variable valve method for an internal combustion engine according to claim 14, further comprising the steps of:

detecting a rotation speed of said internal combustion engine; and

setting the predetermined value of said target lift amount according to the engine rotation speed.

21. A variable valve control method for an internal combustion engine provided with an

intake valve for each of a plurality of cylinders, and a variable valve mechanism that varies successively a lift amount of said intake valve, comprising the steps of:

- calculating a target lift amount corresponding to a target intake air amount of said internal combustion engine;

- detecting a lift amount for each intake valve;

- limiting, when the target lift amount of said intake valve is a predetermined value or less, the target lift amount of said intake valve to said predetermined value or above when the variation in lift amount of said intake valve is an allowable value or above; and

- controlling said variable valve mechanism based on said target lift amount.

22. A variable valve method for an internal combustion engine according to claim 21, further comprising the step of;

- controlling an opening of a throttle valve disposed to an intake pipe of said internal combustion engine, to control an intake air amount to the target intake air amount when limiting the target lift amount to the predetermined value or above.

23. A variable valve method for an internal combustion engine according to claim 21, further comprising the step of;

- outputting a failure detection signal of said variable valve mechanism when the variation in lift amount exceeds a failure judgment value larger than said allowable value.

24. A variable valve method for an internal combustion engine according to claim 21, further comprising the steps of:

- detecting a rotation speed of said internal combustion engine; and

- variably setting the predetermined value of said target lift amount according to the engine rotation speed.